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I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004900464 for a patent by AKTIEBOLAGET ELECTROLUX as filed on 02 February 2004.

WITNESS my hand this
Thirty-first day of January 2005

JANENE PEISKER
TEAM LEADER EXAMINATION
SUPPORT AND SALES

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Gas Burner

Field of the invention

The present invention relates to gas burners for cooking stoves and in particular to a gas burner suitable for use with a wok.

Background of the invention

Wok burners are in the main single injector designs and include those made by Electrolux, Isphording, Sabaf, Defendie and Beckley. These burners are included in stove products sold into the Asian market. However, their performance as a wok burner has led to considerable customer comment about their deficiencies and problems.

Summary of the invention

The present invention provides a gas burner including distributor means having at least one channel to distribute an air gas mixture around said distributor, said distributor means including a plurality of ports through which said gas mixture can pass and be ignited; a plurality of injectors spaced around said distributor, said injectors being positioned to inject gas into a passage via an aperture which has communication with said channel, said aperture being surrounded by a shoulder which is raised relative to a base of said channel, shoulder having at least two shoulder extensions extending away from said aperture.

When there are two shoulder extensions, they can extend in generally opposite directions.

The distributor can have a generally cylindrical outer surface. Further the distributor can be generally ring shaped.

The distributor can have at least two equi-spaced inwardly extending arms.

Preferably there are three equi-spaced radially inwardly extending arms.

The ports can direct streams of air gas mixture into internal regions of said distributor.

The distributor can have a clover leaf configuration.

The distributor means can be segmented whereby each segment has its own channel and injector.

The distributor means can be segmented by means of segment walls between respective segments. Alternatively the distributor means can be segmented by means of gas flow from said injectors.

The shoulder can have three shoulder extensions. The shoulder extensions can form a crescent crossed T shape formation.

The distributor can be mounted on a shaped base including a gas inlet which communicates with a cavity in said base, said injectors communicating with said cavity.

The cavity can be convex shaped whereby the height of said cavity at the outer peripheries is of a height greater than at the centre of said cavity.

The base can have its top surface concave in shape, so as to collect towards the centre of said base any spillage which may occur during cooking.

The shoulder and said passage form a venturi.

The present invention also provides a base for a gas burner, said base having an upper wall and a lower wall held in spaced apart relationship by a peripheral wall to define a cavity therebetween, said base including means to receive an air gas distribution means and an inlet port to allow connection to a supply of gas, which can pressurise said cavity.

The upper wall can be concave relative to the outside of said base. The upper wall can be convex relative to said cavity.

The base either includes at least one injector nozzle, or has one or more ports adapted to receive at least one injector nozzle in each port.

Brief description of the drawings

An embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an assembled gas burner;

Figure 2 is an exploded view of the burner of Figure 1;

Figure 3 is a plan view of the burner of Figure 1;

Figure 4 is an underneath plan view of the burner of Figure 1;

Figure 5 is a side elevation of the burner of Figure 3;

Figure 6 is a side elevation of the burner of Figure 4;

Figure 7 is a cross section through the line VII-VII of Figure 3;

Figure 8 is a cross section through the line VIII-VIII of Figure 3;

Figure 9 is a top perspective view of a distributor used with the burner of Figure 1;

Figure 10 is an underneath perspective view of the distributor of Figure 9;

Figure 11 is a plan view of the distributor of Figure 9;

Figure 12 is a front elevation of the distributor of Figure 11;

Figure 13 is a side elevation of the distributor of Figure 11;

Figure 14 is a cross section through the distributor of Figure 11 along the lines XIV-XIV;

Figure 15 is a perspective view of the distributor of Figure 9 with a schematic depiction of air and gas mixture distribution and flame pattern;

Figure 16 is a larger scale cross section (similar to Figure 8) of the assembled burner of Figure 1, showing air, gas and air/gas mixture flow paths;

Figure 17 is a perspective view of another distributor similar to that of Figure 9 and

Figure 18 is a perspective view of another distributor, similar to that of Figure 9 with outer circumferential burner ports.

Detailed description of the embodiment

Illustrated in Figures 1 to 6 is a burner 10 which is an assembly of five main components. The lowermost component is a cup 12 which forms the base of the burner 10.

The cup 12 is an assembly of a top member 14 and a bottom member 16. The cup bottom 16 has a threaded female gas supply connection 18, a cut out portion 20 which enables a complementary shaped boss 22, on the base 14 of the cup 12, to fit therein. The purpose of the boss 22 will be discussed below.

The cup bottom 16 has four downwardly extending supports 24 which rest against the upper surface of a stove base (not illustrated)to support the cup when mounted in a stove enclosure. Two of the supports 24 have locating lugs extending downwardly therefrom, as each are to be inserted in similarly shaped apertures on a stove enclosure.

The cup bottom 16 is effectively a cover which sealingly sits within a similarly shaped recess 26 located within the lowermost rim 28 of the cup top 14. As can be seen from the cross sections of Figures 7 and 8, the cup bottom 16 is substantially horizontal or straight in its construction. This is contrasted with the central portion 28 of the cup top 14 which is convex or part spheroidal in shape relative to the generally horizontal or straight surface of the cup bottom 16. As a result, the central portion 28 is closer to the cup bottom 16 at its centre compared with the periphery 30, where the spacing away from of the cup bottom 16 is greater. This formation provides a convergent then divergent path for gas flowing from the gas supply connection 18 to the nozzle apertures 38.

The cup top 14 also includes a boss 32 which is raised from the central portion 28. The boss 32 has the same shape as, and overlies, the boss 22 which extends downwardly from the central portion 28. An bore 34 passes through the bosses 22 and 32. The bore 34 allows a spark plug 36 to be positioned therein. From underneath the cup bottom 16 appropriate wiring (not illustrated) is connected to the spark plug 36 to generate a spark when a user desires to do so. The bosses 22 and 32 ensure that the spark plug 36 and all wiring does not pass through the cavity of the cup 12.

Equi-spaced around the perimeter of the cup top 14 are three nozzle apertures 38. The nozzle apertures 38 are threaded and each receive a male threaded injector nozzle (not illustrated). The injector nozzle utilised will depend upon whether the burner 10 is utilised with town gas, natural gas or LPG.

Surrounding the apertures 38 are nozzle bosses 40. The purpose of the nozzle bosses 40 and the boss 32 is to protect the injector nozzle (not illustrated) and the spark plug 36 from

any food or liquid spilt through the burner and onto the cup top 14. The dish shape or concave nature of the upper surface of the central portion 28 of the cup top 14 is such that any liquid or food upon hitting the surface will tend to be directed towards the centre of the cup top 14 and thus away from the injector nozzles (not illustrated) and spark plug 36.

Around the upper rim 42 are three equi-spaced tapered shaped notches 44 which will receive similarly shaped locators 52 extending downwardly from the lowermost rim or skirt of the distributor 50. It will be noted that the notches 44 are on the same imaginary radius of the cup top 14 as the nozzle apertures 38 so that the nozzle aperture 38 and shaped notches 44 are aligned.

The cup bottom 16 is attached to the cup top 14 by means of screws 46 spaced around the perimeter of the cup bottom 16.

Also included in the upper rim 42 of cup top 14 are three mounting holes 48 which are used to secure the assembly of the cup top 14 and cup bottom 16 respectively into a stove enclosure (not illustrated).

The convex shape (relative to the inside or cavity 54 of the cup 12) of the cavity 54 formed between the cup top 14 and cup bottom 15 results in a passage of larger cross sectional area being formed around the outer periphery of the cup 12 whilst a narrower or restrictive passage is provided through the central portions of the cup 12.

The distributor 50 is illustrated in more detail in Figures 9 to 14. The distributor 50 is made from aluminium or sintered steel and as can be seen from the plan view of Figure 11 has a periphery which is circular. The periphery has three equi-spaced locators 52 that are on the same radius as a tapered bore 56. The tapered bore 56 makes up the first portion of a venturi system provided in the distributor 50. The bore 56 begins from a relatively flat face 52 and proceeds to the outlet port 64 on the top surface of the distributor 50.

The distributor 50 is of a generally annular or ring shaped construction with three radially inwardly projecting arms 58 which are of a tapered construction. This tapered construction provides the arms 56 with a minimum height at their extremities 60 which increases to a maximum height at a location radially inward of the base and inboard of the tapered aperture 56.

The upper rim 66 of the distributor 50 terminates in a plane and completely surrounds the end of the distributor 50. At three equi-spaced locations (these locations being circumferentially equidistant from the outlet ports 64), are located segment-separating walls 68 which also terminate in the same plane as the rim 66. The walls 68 interconnect rim 66 with the inner wall 70 which by virtue of the radial arms 58 forms a clover-leaf shaped aperture through the distributor 50. The inner wall 70 at its highest point terminates in the same plane as the wall 68 and rim 66.

Through the inner wall 70 are a series of burner slots 72 of which only one has been numbered in Figure 9, to maintain clarity of the drawing. The slots 72 give the inner wall 70 a castellated appearance. It will be noted that on the inner wall 70 between any two adjacent slots 72 is another much shallower slot 74. The slot 74 helps to maintain a flame from the burner ports when the distributor is in operation, as would be known by a person skilled in the art.

The inner wall 70, between walls 68 and the interconnecting portion of the rim 66, being all the same plane all make contact with a steel cap 80 positioned onto the top of the distributor 50. As is illustrated in the cross sections of Figures 7 and 8, the inner wall 70, segment wall 68 and rim 66 will make contact with the undersurface of the cap 80 and will thereby form a series of burner ports 72' as illustrated in Figures 7 and 8 from the burner slots 72.

As is illustrated in Figure 15 the longitudinal direction of the slots 72 will result, for each segment of the distributor 50, in a flame 84.1, which will form a flame pattern which is schematically depicted in Figure 15. It will be noted that all the directions of the flame pattern are or have a directional component which is directed toward the centre of the distributor.

As can be seen from Figures 9 and 11 each segment, at a location adjacent the rim 66, inner wall 70 and segment walls 68, has a channel 76. The channel 76 makes a circuit around the periphery of the segment. It can be seen from Figures 9 and 11 that a crescent crossed T shaped shoulder 78 forms the inner wall of the peripheral channel.

It will be noted from the cross section of Figure 14 and the cross section of Figures 7 and 8 that the shoulder 78 terminates at a level or height above the channel base 82 which is below the plane containing the termination of the rim 66, walls 68 or inner wall 70. This

construction means that any gas passing out of the cup assembly 12 via the nozzle apertures 38 and the injector nozzles (not illustrated), will travel upwardly through the tapered aperture 56 and whilst doing so will entrain primary air (see arrows 200 as illustrated in Figure 16). The air gas mixture will pass out of the outlet port 64 and travel in the direction of the orange arrows 84 of Figure 16, thereby pressurising the channel 76 with an air gas mixture. Once one burner port 72' has the exiting air gas mixture ignited by means of the spark plug 36, all the rest of the ports 72' will catch alight and a flame pattern as schematically depicted in Figure 15 will result.

The shoulder 78 extends in two directions away from the aperture 64. The directions are generally opposite to each other and parallel to the rim 66. However, the shoulder 78 also extends in a radially inward direction along the radially inwardly directed arms 58.

As can be seen from Figure 16, the gas represented by black arrows 200.1 enters through the female connector 18. This gas entrains the primary air represented by white dashed arrows 200.3 in Figure 16 and this is used for combustion (see dotted white arrows 200.3) at the burner ports 72' as illustrated in Figures 8 and 7. The lower rim of the distributor 50 has three equi-spaced cut-outs86 which have the same centre as the segment walls 68. The cut-outs 86 allow secondary air represented by grey dashed arrows 200.2 to pass from outside to the inside of the distributor 50 and thus be entrained and combusted with the air gas mixture.

The distributor 50 rests on the cup assembly 12 by means of the locators 52 being positioned within the shaped notches 44. This will align the tapered apertures 56 and outlet ports 64 over the nozzle apertures 38 and associated injector nozzles (not illustrated). Having three 3 equi-spaced locators 52, will ensure the alignment of these features in any of the three possible orientations of the distributor 50 on the cup 12.

The lowermost rim 88 on either side of the locators 52 (the lowermost rim being the edge of the surface 62 of Figure 10) will rest against the upper rim 42. As can be seen from the cross sections of Figures 7 and 8, a gap indicated by the distance 90 in Figures 7 and 8 will be located between the flat surface 62 and the upper surface of the nozzle bosses 40. This gap will allow air to be entrained by gas flowing from the injector nozzles (not illustrated) when the burner is assembled and connected to a supply of gas.

The cup assembly 12 can be manufactured from aluminium and an appropriate gas tight seal provided between the cup bottom 16 and the cup top 14. For cleaning purposes there is no securing of the distributor 50 onto the cup top 14, and neither is the cap 80 secured to the distributor 50 for the same reason.

While wall 68 is provided to segment the distributor 50, it is believed that such a segment wall may not be required. If the wall 68 were not present, and assuming the influence of equal gas pressure emanating from the injectors nozzles via outlet port 64, it is envisaged that the flow of gas will functionally segment the distributor 50 as currently results by means of the segmented wall 68.

If desired the number of radially inward arms 58 can be reduced to two or increased to four, five or six depending upon the outside diameter of the distributor 50.

Illustrated in figure 17 is a modified distributor 250, which is similar to the distributor 50, with like features being like numbered. The difference between the distributor 250 and when compared to the distributor 50 is that the portion of the channel 76 which runs adjacent to the rim 66 has been removed from the distributor 50 and the distributor 250 has the shoulder 78 extending radially inwardly from the rim 66 without a channel portion being located between the rim 66 and the shoulder 78. Thus the channel 276 is only adjacent the inner wall 70 in the distributor 250.

Illustrated in Figure 18 is a modified distributor 350 which is similar to the distributor 50, and accordingly, like parts have been like numbered. The difference between the distributor 350 when compared to the distributor 50 is that the distributor 350 has radially outwardly directed burner ports 350.1 and 350.2 in the outer circumference or rim 66. The ports 350.1 are approximately the same size as the ports 74 on the internal perimeter of the distributor 350, while the ports 350.2 are approximately the same size as the ports 74 on internal perimeter of the distributor 350. These burner ports 350.1, 350.2 help to increase the thermal output of the assembled burner.

Another difference is that there are two walls 68 forming the terminus of each segment. Between the adjacent walls 68 is a groove 350.3. The purpose of the groove 350.3 is to allow cross lighting or flame propagation from inside the burner to the ports 350.1 and 350.2, when the inwardly directed ports are ignited.

It will be understood that the invention disclosed and defined herein extends to al alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

The foregoing describes embodiments of the present invention and modifications, obvious to those skilled in the art can be made thereto, without departing from the scope of the present invention.

Claims:

1. A gas burner including:

a distributor means having at least one channel to distribute an air gas mixture around said distributor, said distributor means including a plurality of ports through which said gas mixture can pass and be ignited;

a plurality of injectors spaced around said distributor, said injectors being positioned to inject gas into a passage via an aperture which has communication with said channel, said aperture being surrounded by a shoulder which is raised relative to a base of said channel, shoulder having at least two shoulder extensions extending away from said aperture.

2. A burner as claimed in claim 1 wherein there are two shoulder extensions, which extend in generally opposite directions.

3. A burner as claimed in claim 1 or claim 2 wherein said distributor has a generally cylindrical outer surface.

4. A burner as claimed in any one of claims 1 to 3 wherein said distributor is generally annular.

5. A burner as claimed in any one of claims 1 to 4 wherein said distributor has at least two equi-spaced inwardly extending arms.

6. A burner as claimed in claim 5 wherein there are three equi-spaced radially inwardly extending arms.

7. A burner as claimed in any one of claims 1 to 6 wherein said ports direct streams of air gas mixture into internal regions of said distributor.

8. A burner as claimed in claims 1 to 7 wherein said distributor has a clover leaf configuration.

9. A burner as claimed in claims 1 to 8 wherein said distributor means is segmented whereby each segment has its own channel and injector.

10. A burner as claimed in claim 9 wherein said distributor means is segmented by means of segment walls between respective segments.

11. A burner as claimed in claims 1 to 9 wherein said distributor means is segmented by means of gas flow from said injectors.

12. A burner as claimed in any one of the previous claims wherein said shoulder has three shoulder extensions.

13. A burner as claimed in claim 12 wherein said shoulder extensions form a crescent crossed T shape formation.

14. A burner as claimed in any one of the previous claims wherein said distributor is mounted on a shaped base including a gas inlet which communicates with a cavity in said base, said injectors communicating with said cavity.

15. A burner as claimed in claim 14 wherein said cavity is convex shaped whereby the height of said cavity at the outer peripheries is of a height greater than at the centre of said cavity.

16. A burner as claimed in claim 14 or 15, wherein said base can have its top surface concave in shape, so as to collect towards the centre of said base any spillage which may occur during cooking

17. A burner as claimed in any one of the preceding claims wherein said shoulder and said passage form a venturi.

18. A burner as claimed in any one of the preceding claims wherein said distributor has an internal and an external perimeter, with inwardly directed ports in said internal perimeter and outwardly directed ports in its external perimeter.

19. A base for a gas burner,

said base having an upper wall and a lower wall held in spaced apart relationship by a peripheral wall to define a cavity therebetween, said base including means to receive an air gas distribution means

and an inlet port to allow connection to a supply of gas, which can pressurise said cavity.

20. A base for a gas burner as claimed in claim 19, wherein said upper wall is concave relative to the outside of said base.

21. A base for a gas burner as claimed in claim 19 or 20, wherein said upper wall is convex relative to said cavity.

22. A base for a gas burner as claimed in any one of claims 19 to 21, wherein said base either includes, or has one or more ports adapted to receive at least one injector nozzle.

23. A burner being substantially as hereinbefore described with reference to figures 1 to 16, or 17 or 18 of the drawings.

24. A base for a gas burner, being substantially as hereinbefore described with reference to figures 1 to 8 and 16 of the drawings.

Dated this 2nd day of February 2004

AKTIEBOLAGET ELECTROLUX

By its patent attorneys

HALFORD & CO

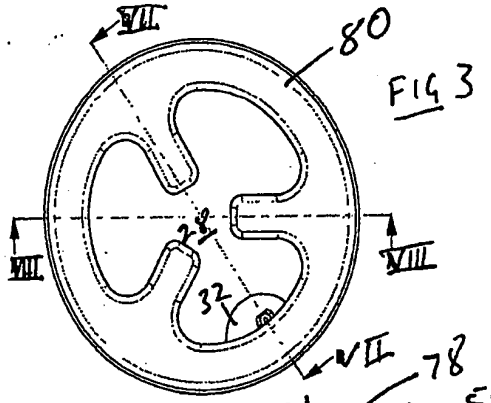

FIG 3

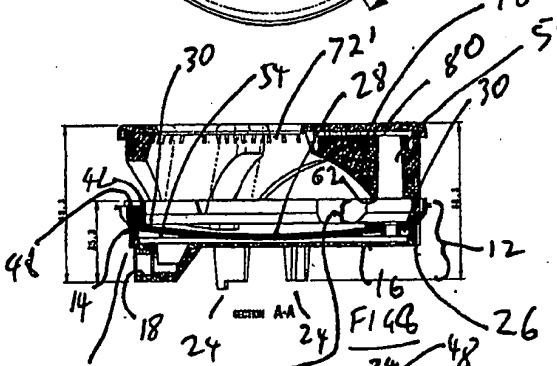

FIG 6

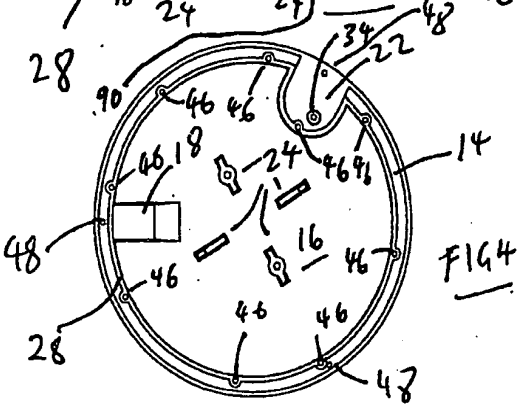

FIG 4

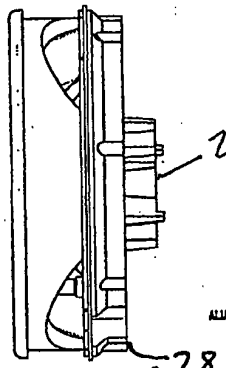

FIG 5

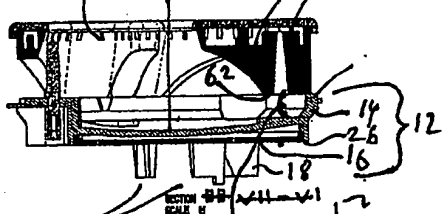

FIG 7

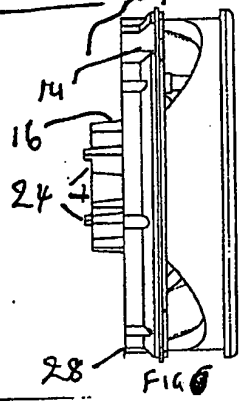

FIG 8

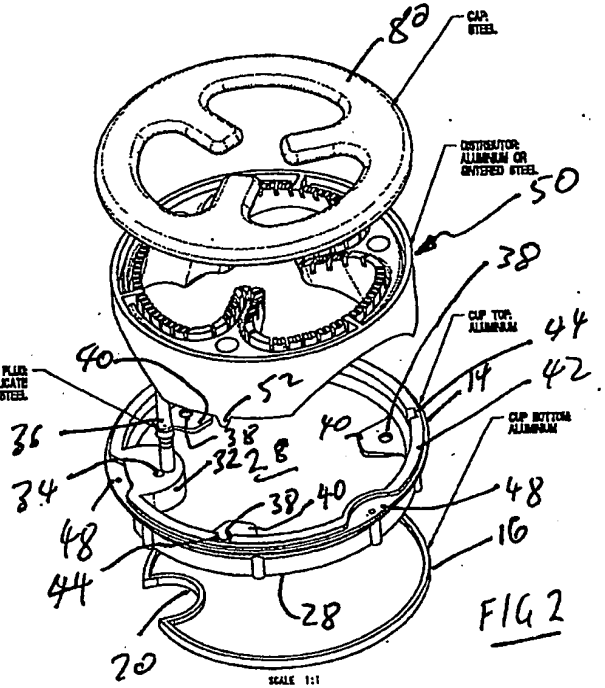

FIG 2

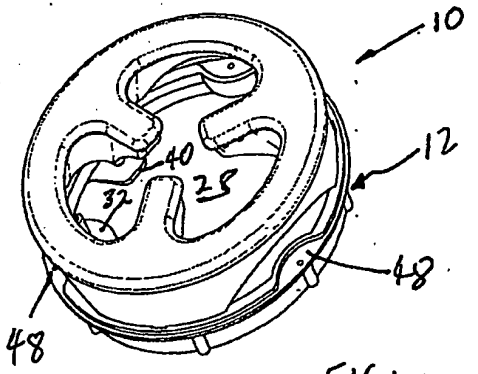

FIG 1

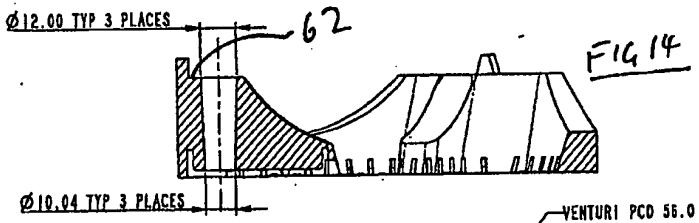

FIG 14

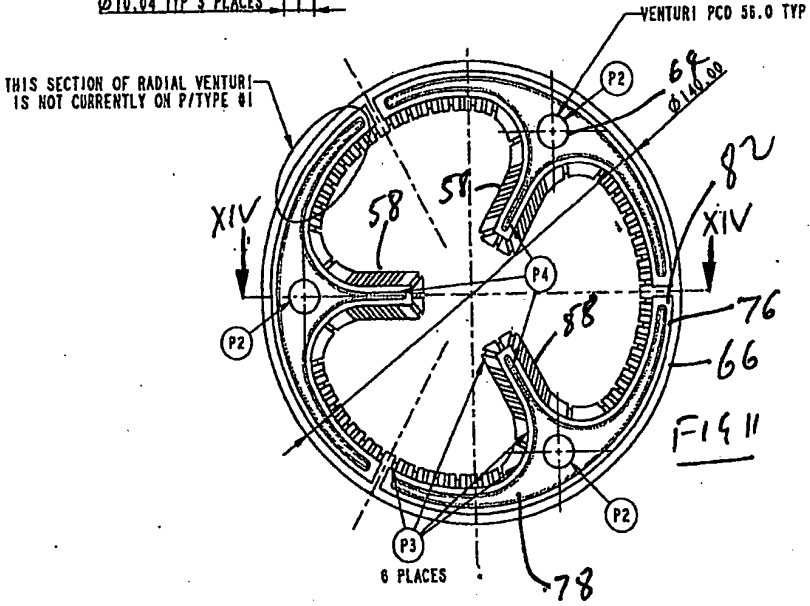

FIG 11

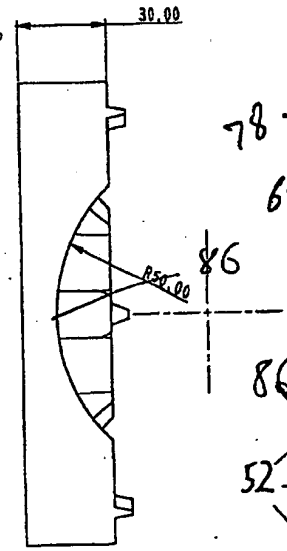

FIG 13

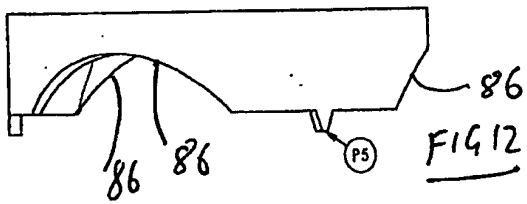

FIG 12

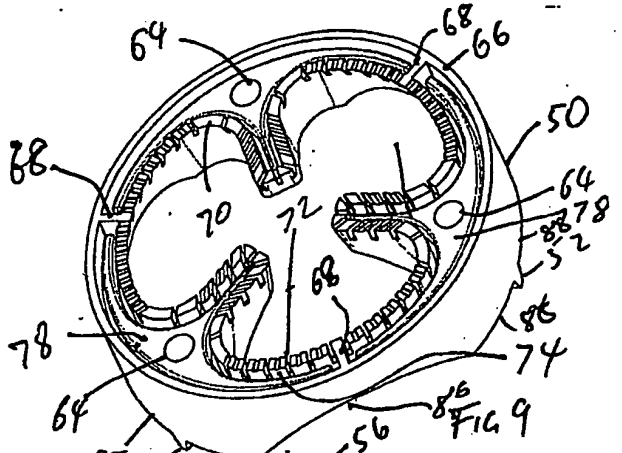

FIG 9

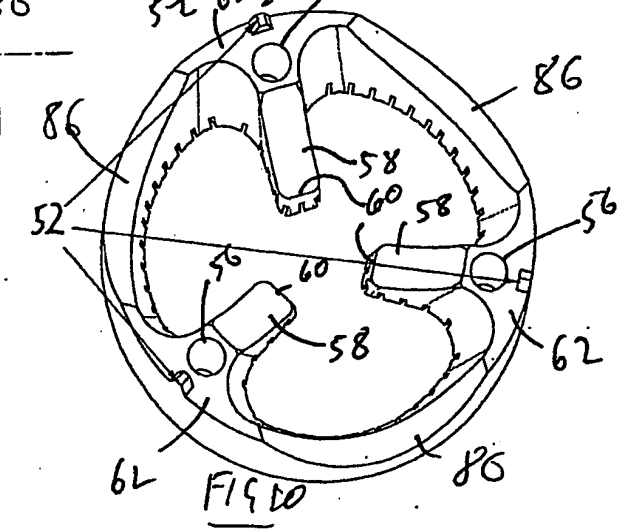

FIG 10

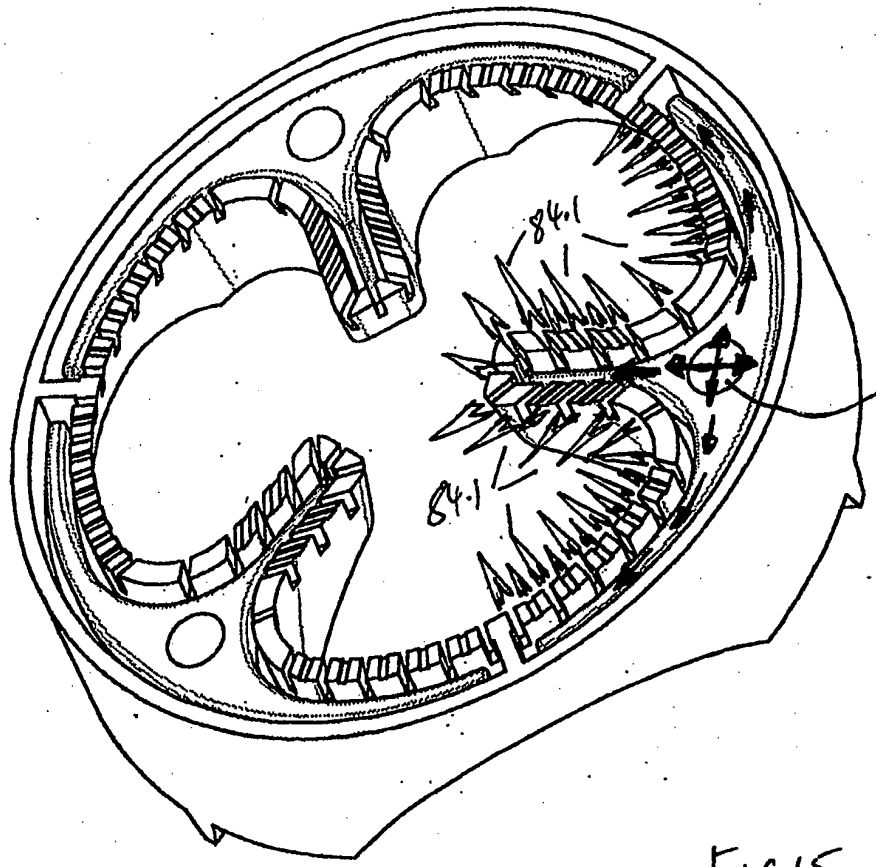

FIG 15

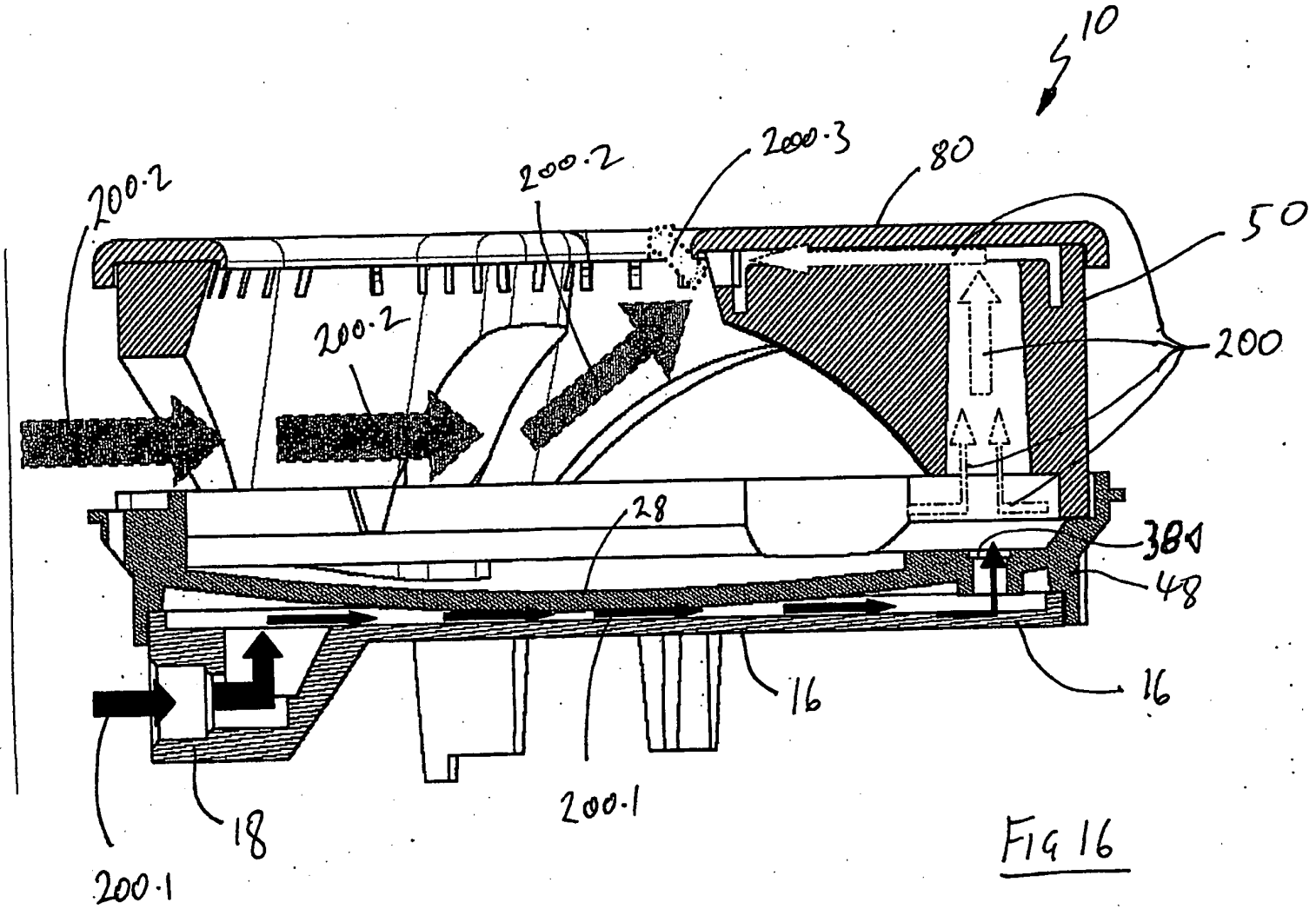

Fig 16

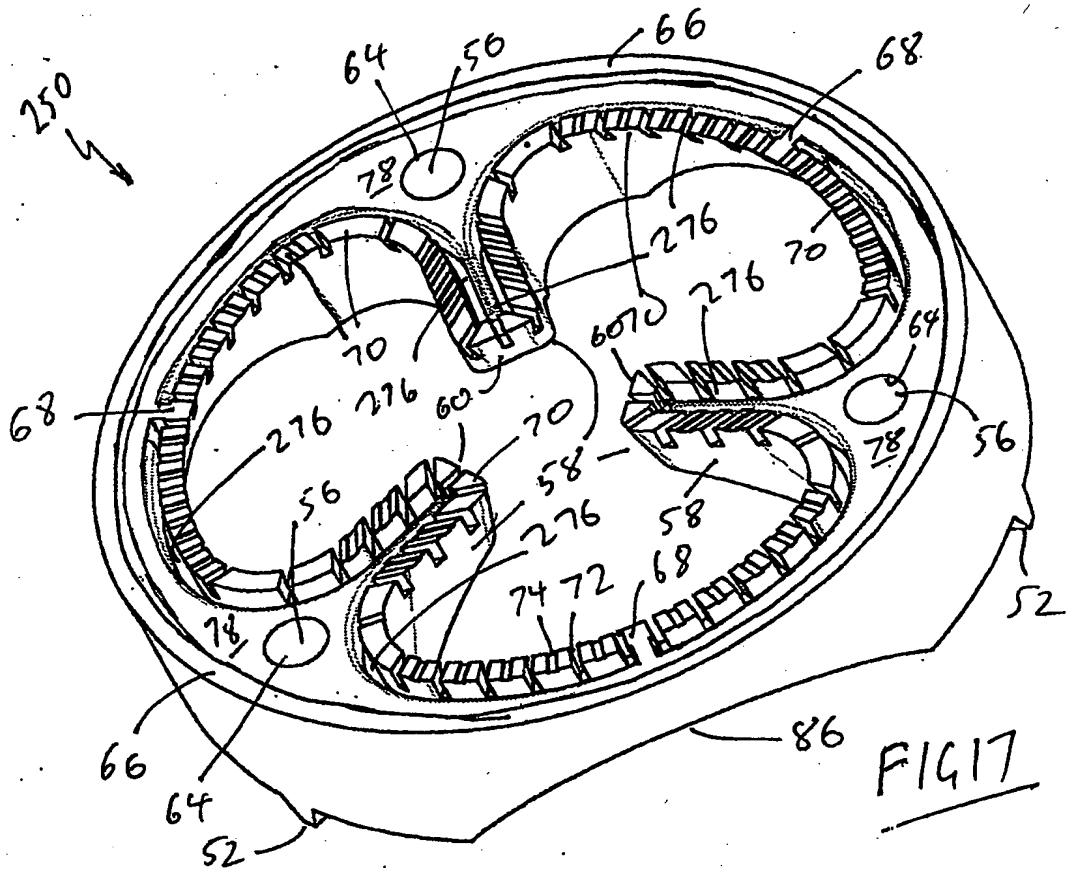
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FIG 17

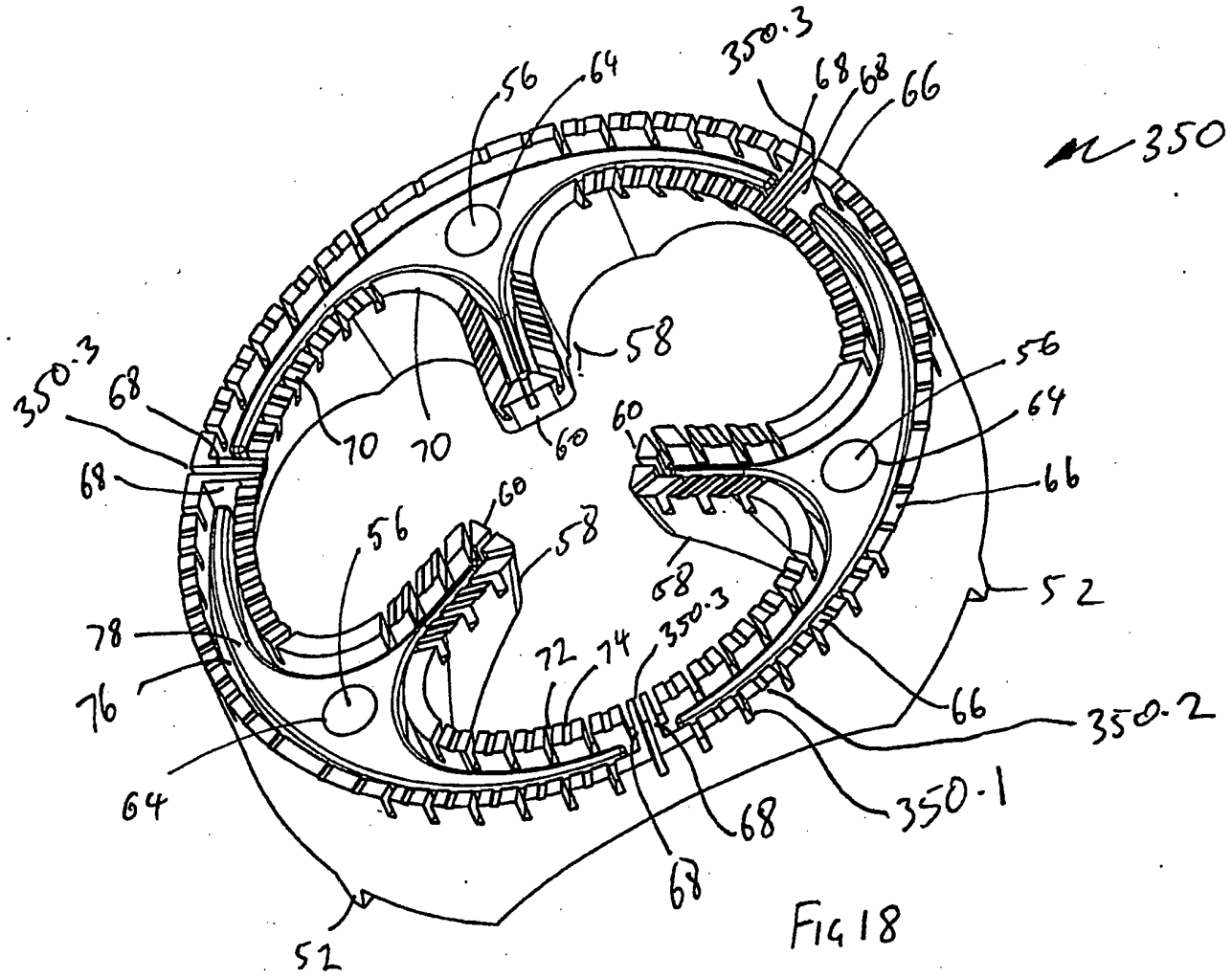
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Fig 18